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Contents

Video Communication Optimization in Manet

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ABSTRACT

A Mobile Ad Hoc Network (MANET) is composed of mobile nodes without any infrastructure like wireless access points or base stations. Recent advances in computing technology, encoding schemes, high link bandwidth and high-speed networks have made it feasible to provide real- time multimedia services over the Internet. Video Transmission with high resolution increases the network traffic that can result the packet loss over the network. The situation becomes more critical when the network is having some attacker node that performs the flooding so that that the networks delay is increased over the network. To achieve the effective communication in such attacked infected clustered mobile network, an attack preventing routing scheme is suggested in this paper. To provide the effective communication over this delayed mobile network, a distinctive multipath based data chunk sequencing scheme is suggested in this paper.

Keywords: attacks, MANET, video streaming, packet loss.

I. INTRODUCTION

Mobile computers, such as PDAs and laptop computers with multiple network interfaces are becoming very common these days. Many of the applications that run on such devices involve multimedia, such as video conferencing, audio conferencing, watching live movies, sports, etc. Streaming multimedia over wireless networks is a challenging task. Extensive research has been carried out to ensure a smooth and uninterrupted multimedia transmission to a Mobile Host (MH) over wireless media. Recent advances in computing technology, encoding schemes, high link bandwidth and high-speed networks have made it feasible to provide real-time multimedia services over the Internet. Real-time multimedia, has timing constraints. The feature of playing back audio or video in real time over the internet is called multimedia streaming. For example, audio and video data must be played out continuously. If the data does not arrive well in time, the play out process will pause, which is very annoying to human ears and eyes. Real-time transport of live video or stored video is the predominant part of real-time multimedia. Multimedia streaming applications have their own specific requirements described as follow.

- Bandwidth

To achieve acceptable perceptual quality, a streaming application should typically have minimum bandwidth requirement. For video streaming, congestion control takes the form of rate control, i.e. adapting the sending rate to the available bandwidth in the network.

- Delay

Streaming media has limited end-to-end delay so that packets can arrive at the receiver in time to be decoded and displayed. If a video packet does not arrive in time, the playout process will pause, which is annoying to human eyes. A video packet that arrives after its playout time is useless and can be regarded as lost. To reduce the effect of time-varying delay in the network and to provide continuous playout, a playout buffer is generally used at the receiver side.

- Loss

Packet loss is unavoidable in the Internet and can distort audio or video quality, which is not acceptable. So, it is desirable to make a multimedia stream robust to packet loss. Multiple description coding is such a compression technique to deal with packet loss.

- Simple playout function

Streaming applications like VoD (video on demand) or online music require playout functions, for ex- stop, pause/resume, fast forward, fast backward, and random access.

- Decoding complexity

Today is the world of mobile device like cellular phones and personal digital assistants (PDAs) which require low power consumption. Therefore, streaming applications for these devices must be simple and have low decoding complexity is desirable.

II. RELATED WORK

According to [1], attacks on ad hoc networks generally fall into two categories: routing- disruption attacks and resource-consumption attacks. Much progress has been made in securing ad hoc networks against these attacks recently; however, none of them considers dropping attacks exploiting cross-layer knowledge. In paper [2], a novel scheme for Detecting Blackhole Attacks in MANETs (so- called DBA-DSR) is introduced. The blackhole problem is detected and avoided by BDA-DSR protocol, before the actual routing mechanism is started by using fake RREQ packets to catch the malicious nodes. according to simulation results, the proposed DBA-DSR scheme outperforms DSR in terms of packet delivery ratio and network throughput. Existing selective encryption approaches [3-5] have

been effectively applied to different multimedia codec's such as MPEG1, MPEG2, MP3, MPEG4, H.264, etc. One of the first approaches to partial encryption was proposed by Meyer and Gadgast [5] in 1995 for MPEG-1 bit streams. The principle data to be secured included: all the headers, I frames, and I blocks. They proposed a number of combinations of the above scheme to attain different levels of security. Kachirski and Guha [6] proposed a cluster-based Intrusion detection system using mobile agent technologies. The proposed system uses mobile agents each performing a particular role. The results of each node are aggregated in cluster points in order to limit the packet monitoring task in a few nodes and minimize the IDS-related processing time by each node. Huang et al. [7] proposed a mechanism that needs separate monitoring nodes, specifically one monitor per cluster (nodes that are in one-hop range form a cluster). Monitors should be active for this approach. If there is one monitor per cluster, the monitor does most of the work. It may happen that monitor nodes run out of energy before the network does or before the network gets partitioned.

III. VIDEO COMMUNICATION OPTIMIZATION TECHNIQUE

Video Transmission with high resolution increases the network traffic that can result the packet loss over the network. The situation becomes more critical when the network is having some attacker node that performs the flooding so that that the networks delay is increased over the network. To achieve the effective communication in such attacked infected clustered mobile network, an attack preventing routing scheme is suggested here. To provide effective communication over this delayed mobile network, a distinctive multipath based data chunk sequencing scheme is suggested in this paper. The presented work is divided in three main stages.

- In first stage, the optimized route between the source and destination is identified. This identification is performed based on delay and loss analysis.
- Once the optimized route is identified, the next stage is to identify the substitution node of all intermediate nodes between source and destination. By performing the optimum threshold analysis, multiple routes are generated between source and destination. The identified multiple routes will not share any common intermediate node. In this stage, the attacker node identification will be done at the initial stage, the node having the delay more than threshold value will be treated as the attacker node or the delay node. After this stage, N number of attack preventive routes will be identified.
- Now to start the actual communication, in third stage, the video data will be converted to small chunks. The data chunks will be identified based on the available routes so that each route will get M data chunks. Finally, these data chunks will be send in parallel on multiple paths so that the network traffic will be distributed. At the receiver end, the data will be accepted from all these

chunks and retrieved as the final video data. The presented work will be implemented in clustered network.

Flow chart of above suggested scheme is given below:

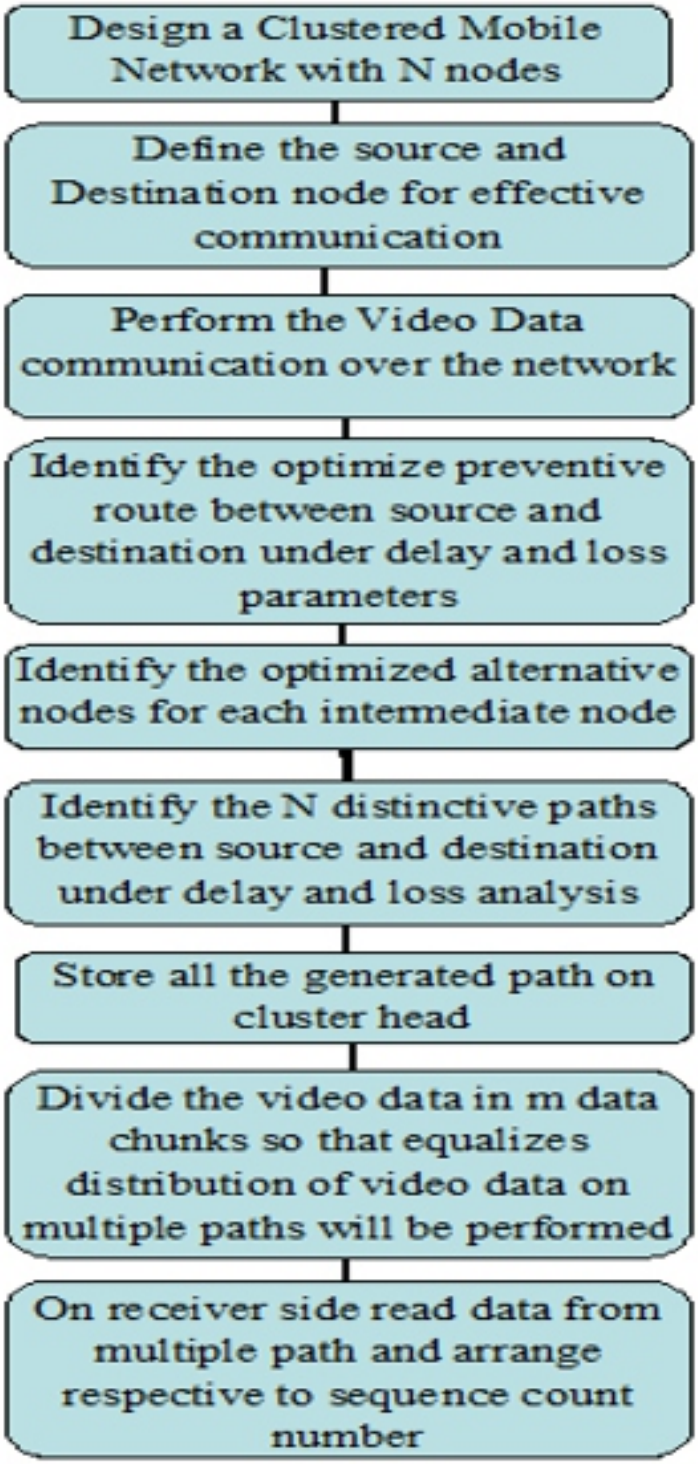

Fig1. Video optimization scheme

The suggested scheme is divided in following three main stages:

Stage 1: Optimized preventive route identification

At the earlier stage, the optimized attack preventive path will be identified between source and the destination. The route identification will be done under different parameters. The parameters included will be the loss analysis and delay analysis.

State 2: Distinctive Multipath identification

In this stage, the alternative for all intermediate nodes between source and destination will be identified. This alternative node identification will be done under the loss and delay analysis. Based on these nodes, the distinctive alternate paths between source and destination will be identified.

Stage 3: Parallel Video data Communication

In this stage, the video data will be divided in smaller data chunks and these data chunks will be communicated over multiple paths. This will perform parallel video communication over the network will be performed. At the receiver side these data chunks will be retrieved and sequenced to form the video data.

The significance of presented scheme is given here under

1. The presented scheme will use the distinctive path scheme so that the load over a specific node will not increase that will reduce the data loss.
2. It will identify the effective route based on communication analysis so that the attack preventive communication will be performed.
3. The parallel communication over the network will improve the effectiveness of communication.

IV. CONCLUSION

In this paper we have suggested an attack preventing routing scheme that will be implemented in ns2. To provide the effective communication over this delayed mobile network, this distinctive multipath based data chunk sequencing scheme is suggested. The presence of Dropping Attack affects all the parameters of network especially the throughput of the network affecting the Quality of multimedia data transmission. Proposed technique is very effective to detect and prevent the Dropping Attack. As this technique will use the distinctive path scheme so that the load over a specific node will not increase that will reduce the data loss.

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Hadoop Mapreduce: The Quintillion Data Analyzer

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ABSTRACT

With the continuous advance in computer technology over the years, the quantity of data being generated is growing exponentially. Major sources of these data include social media, retailer databases, financial and medical institutions among others. These data come in different formats which include audio, video, text documents, and web pages etc. some of which are structured, semi-structured or unstructured. This poses a great challenge when these data are to be analyzed because conventional data processing techniques are not suited to handling such data. This is where Hadoop Map Reduce comes in. Hadoop Map Reduce is a programming model for developing applications that process large amount of data in parallel across clusters of commodity hardware in a reliable and fault-tolerant manner. This report covers the origin of Hadoop Map Reduce, its features and mode of operation, describes how it is being implemented, as well as reviews how some Information Technology companies are making use of it.

Keywords: Map Reduce, Hadoop, Task, Job Tracker, Programming

1. INTRODUCTION

The quantity of data being generated on a daily basis is quite alarming. For example, statistics from 2014 info graphics show that every minute:

- Facebook users share nearly 2.5 million pieces of content.
- Twitter users tweet nearly 300,000 times.
- Instagram users post nearly 220,000 new photos.
- YouTube users upload 7 hours of new video content.
- Apple users download nearly 50,000 apps.
- Email users send over 200 million messages
- Amazon generates over $80,000 in online sales.
-

Also, with the internet of things, the amount of data generated by car sensors, railway sensors, GPS devices and other devices is also at a very high level. Various medical and research institutions also tend to gather an enormous amount of data each day. In fact, according to IBM, every day we create an average of 2.5 quintillion bytes of data (equivalent to 2.3 trillion gigabytes).Wow! These large amounts

of data come in various formats ranging from images, videos, JSON strings, audios, PDFs, web pages, text documents even to 3D models. Data of this nature is known as Big Data.

Efforts to simplify data processing have always been a matter of research and development. In the year 2000, Seinst Inc. developed a C++ based distributed file sharing framework to be used for data storage and query. The system was able to store and distribute structured, semi- structured and unstructured data across multiple servers. Developers could build queries with a modified C++ language called ECL. By 2004, Lexis Nexis had acquired and merged Seinst Inc and Choice Point Inc. and their high speed parallel processing platform into HPCC Systems. That same year, Google published a paper on Map Reduce - a similar architecture to the HPCC Systems. The framework turned out to be successful so others wanted to replicate the algorithm. Hence, an implementation of the Map Reduce framework was adopted by an Apache open source project named Hadoop. Hadoop allows for distributed processing of large data sets across clusters of computers using simple programming models. It is very scalable as it can scale up from single servers to thousands of machines with each offering local computation and storage. The library is designed to detect and handle failures at the application layer while delivering highly-available service on top of a cluster of computers which may be prone to failures. The Hadoop MapReduce is a software framework or programming model for developing applications that big data in parallel across clusters of commodity hardware in a reliable and fault-tolerant manner. Being a programming model, it is only made use of by developers.

Some developers still make use of conventional data storage and processing techniques (such as relational databases) to store and harness information from large data sets which proves to be inefficient these days. Hence, there is a need for them to adopt a new method of developing applications that can process information in a very efficient and fault-tolerant way.

Since its inception, the Map Reduce framework has been a subject of research and discussion among various experts, professionals and institutions. Many of these researchers have praised the subject. Map Reduce is arguably the most successful parallelization framework especially for processing large data sets in datacenters comprising commodity computers (Zhiqiang & Lin, 2010).MapReduce has proven to be a useful abstraction and greatly simplifies large-scale computations(Prasad, 2009).The research community uses Map Reduce and Hadoop to solve data-intensive problems in bioinformatics, computational finance, chemistry, and environmental science(Serge, 2013). In praise of Hadoop Map Reduce, Andrew McAfee and Erik Brynjolfsson, 2011, stated: “The evidence is clear: Data-driven decisions tend to be better decisions. Leaders will either embrace this fact or be replaced by others who do” (McAfee & Brynjolfsson, 2011).

Despite its numerous benefits, a number of researchers have criticized Map Reduce for different reasons. Even if high-level, declarative-style abstractions exist and have been widely adopted, Hadoop Map Reduce is still far from offering interactive analysis capabilities (Vasiliki & Vladimir, 2014). The most popular of these criticisms is found in David De Witt and Michael Stonebraker, 2008. There, Map Reduce was described as "a giant step backwards":

"As both educators and researchers, we are amazed at the hype that the Map Reduce proponents have spread about how it represents a paradigm shift in the development of scalable, data-intensive applications. Map Reduce may be a good idea for writing certain types of general-purpose computations, but to the database community, it is a giant step backward in the programming paradigm for large-scale data intensive applications".(DeWitt & Stone-breaker, 2008)

David DeWitt and Michael Stone-breaker also stated that Map Reduce is not novel at all – It represents a specific implementation of well-known techniques developed nearly 25 years ago, it is missing most of the features that are routinely included in current DBMS and it is incompatible with all of the tools DBMS users have come to depend on.

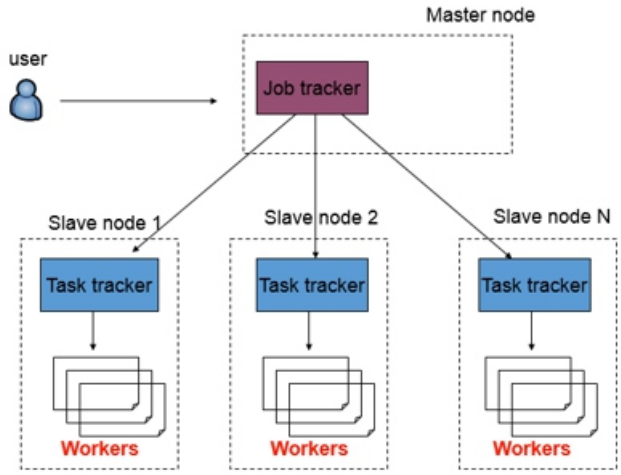
Is Map Reduce truly missing most of the features that are routinely included in current database management systems? Another component of Hadoop (HBase) is responsible for having those features included in current DBMS and as such, the burden should not be placed on Map Reduce. It is correct to state that Map Reduce is not the best solution there can be to solving the problem of Big Data, but indeed it is good enough and has room for improvement.

The aim of this study is to discover how Hadoop Map Reduce technology solves the problem of Big Data Processing. It will also aid readers to understand how Hadoop Map Reduce works, the importance of Hadoop Map Reduce and how Hadoop Map Reduce is implemented.

In order to achieve the objective of this study as earlier stated, this report covers the history of Hadoop Map Reduce, the features of Hadoop Map Reduce, the mode of operation of Hadoop Map Reduce, the implementation of Hadoop Map Reduce, the applications of Hadoop Map Reduce, the benefits of Hadoop Map Reduce and the limitations of Hadoop Map Reduce.Also, implementing Hadoop Map Reduce is a broad subject and may not be covered in full details here. A proper introduction into the methodologies used in implementing Hadoop Map Reduce is provided to aid readers who wish to go further into its implementation.

2. FEATURES OF HADOOP MAP REDUCE

The Hadoop Map Reduce framework consists of a single Job Tracker (known as the master) and one Task Tracker per node in the cluster (known as slaves or workers). The Job Tracker is responsible for scheduling the jobs‟ component tasks, monitoring them and re-executing the failed tasks. The Task Trackers execute the tasks as directed by the Job Tracker. Both the input and the output of the job are stored in a file-system.



Features of Hadoop Map Reduce Source: (Shi, 2008)

Applications which implement Map Reduce usually specify the input and output locations and supply Map and Reduce functions via implementations of appropriate interfaces and/or abstract- classes. These and other parameters are known as the Job configuration. The Hadoop client then submits the job (either in jar/executable form) and the configuration to the Job Tracker which then distributes the software and configuration to the Task Trackers, schedules the tasks, monitors them, provide status and diagnostic information to the job client.

3. MODE OF OPERATION

A MapReduce job usually splits the input data set into independent blocks of data which are assigned to Map tasks (functions) in a completely parallel manner. The output of the map is then sorted and given as input to the Reduce tasks (functions) to produce the final result. Hadoop Map Reduce works exclusively on <key, value> pairs. It views the input to the job as <key, value> pairs and produces its output from the job as a set of <key, value> pairs. It makes use of an interface known as the Writable interface to serialize the Key and Value classes. These classes have to implement the interface. Also, the key class has to implement the Writable Comparable interface in order to facilitate sorting by the framework. The input and output of the Map Reduce jobs can be depicted as:

(Input) <k1, v1>→ map →<kv2>→ combine →<k2, v2>→ reduce →<k3, v3> (output)

Applications which implement Map Reduce usually implement the Mapper and Reducer Interfaces which provide several methods for different tasks.

MAPPER

The Mapper is responsible for mapping input Key/Value pairs to a set of intermediate Key/Value pairs. The individual tasks that transform input records into intermediate records are known as Maps. The result of the maps does not necessarily have to be of the same data type as the input records. The output of the Maps are sorted then partitioned per Reducer. The total number of partitions depends on the number of reduce tasks for the job (this usually depends on the number of keys) and they are always equal. The Map Reduce framework subsequently groups the intermediate values which are associated with a given output key and passes them to the reducer(s) to determine the final output. When developing applications with the Hadoop Map Reduce framework, users can control which keys go to which Reducer by implementing an interface known as Partitioner.

REDUCER

After the Mapper has successfully mapped the input, the Reducer reduces the set of intermediate values which share a common key into smaller set of values. The user specifies the number of reduces for the job using specific functions. The reducer consists of three (3) primary phases.

1. Shuffle
2. Sort
3. Reduce

Shuffle: In this phase, the Map Reduce framework fetches the relevant partition of all the mappers via Hyper Text Transfer Protocol (HTTP).

Sort: In this phase, the framework groups Reducer input by Keys (because different mappers may have produced output with the same key). The shuffle and sort framework occur simultaneously. That is, as map-outputs are being fetched, they are merged.

Reduce: In this phase, the reduce method is called for each <key, list of values > pairs in the grouped input. Then the output is written to the file system.

SAMPLE PROBLEM

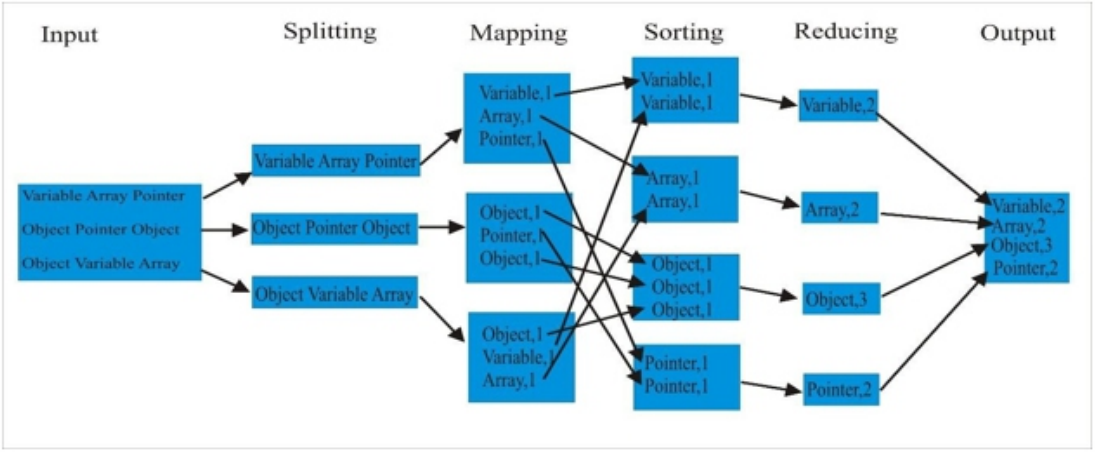
To understand the whole Map Reduce process, let us assume that we have an application which counts the number of times a Computer Science student of Madonna University used certain words during CSC317 examination. Let‟s also assume we have the following words appearing in different sentences:

Variable Array Pointer
Object Pointer Object
Object Variable Array

The main steps Map Reduce would take to process the data would be:

1. Get the input data.
2. Split the data into separate blocks.
3. Assign the blocks to Map tasks.
4. Sort the output of the Map tasks.
5. Reduce the sorted data using the Reduce tasks.
6. Store the output in the file system.

The following diagram illustrates the process:



Execution of a Map Reduce count program Modified from: (Zaharia, 2012)

Breaking down these steps, we can understand how each activity took place.

First the input was split into 3 blocks:

- Block 1-Variable Array Pointer
- Block 2-Object Pointer Object
- Block 3-Object Variable Array

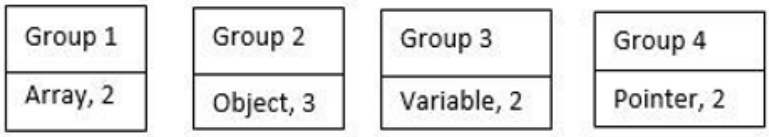
Then the Mapper transforms the inputs to intermediate <key, value> pairs:

Map Task 1:
Variable, 1 Array, 1 Pointer, 1

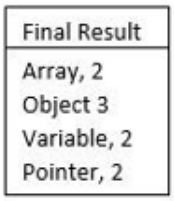
Map Task 2:
Object, 1 Object, 1 Pointer, 1

Map Task 3:
Object, 1 Variable, 1 Array, 1

These values are passed to the Reducer. In the Reducer, the data passes through the Shuffle and Sort phases which then group the data by keys:



Finally, the Reduce phase reduces the data and stores them in the file system.



When you picture this behaviour on larger data, you will really appreciate Hadoop Map Reduce.

4. IMPLEMENTING HADOOP MAP REDUCE

Hadoop has tools that help the successful development of a Map Reduce application, e.g. HBase, Hive, Pig, Oozie, Mahout Etc. One thing is common for all of them – they must include the Hadoop library, and the programs must follow the same structure of having map and reduce functions or methods. The following pseudocode shows an example of a Map Reduce program. The program counts the occurrence of each word in a large input document – similar to the sample problem we saw while understanding the mode of operation of Hadoop Map Reduce.

```
Map (String fileName, String file Contents)
{
For each word key in file Contents: EmitIntermediate(key, "1");
}
Reduce(String word, Iterator Values)
{
int occurrence = 0
for each v in values:
occurrence+= 1;
Emit(AsString(occurrence));
}
```

In the Map method, the file Name parameter is input key while the file Contents parameter is input value. With the aid of a Map Reduce API"s, the code loops through the file Contents and finds each word. It then passes the word and the value „1" to another Map Reduce method to emit the intermediate <key, value> pairs. This method sorts the data and triggers the reducer.

In the Reduce method, the word parameter represents the input key and the Values parameter represents a list of counts. Just as we‟ve seen in the sample problem, the reduce method is called for each <key, list of values > pairs in the grouped input. It adds up the number of occurrence of the keys and then the output is written to the file system.

5. SOME EXISTING USERS

Hadoop Map Reduce is applicable in all areas of life where data is being generated. This is because the data being generated will certainly need to be stored and processed. Due to its awesome benefits, a number of "Big" companies have already started using Map Reduce. They include: Facebook, Yahoo, Amazon, eBay, Google, IBM, The New York Times, and Walmart Facebook started using Hadoop in 2007. As at then, developers at Facebook were using it to import a few data sets and writing Map Reduce jobs to manipulate them. At the success of this, they started using it for major projects such as Facebook Lexicon – the tool where you can see the buzz surrounding different words and phrases on Facebook Walls. Most data stored in Hadoop's file system is published as Tables, classic data warehouse features like partitioning, sampling and indexing were added to the environment. This in-house data warehousing layer over Hadoop is called Hive – One of the software mentioned in the preceding sections implementing Hadoop Map Reduce.

Amazon implements Map Reduce in their Amazon Elastic Map Reduce (Amazon EMR). It is a web service that makes it easy to process vast amounts of data quickly and cost-effectively.

Every day, a number of users adopt Hadoop Map Reduce for processing data and join in enjoying its benefits.

6. BENEFITSAND LIMITATIONSOF HADOOP MAPREDUCE

MapReduce provides a lot of benefits. They include:

1. Cost-efficiency - MapReduce requires commodity hardware to function. Also, its fault- tolerance is automatic. Hence, fewer admins are needed on the network.
2. Simplicity – Developers intending to implement MapReduce can write applications with their language of choice such as Java, C++ or Python. Also, MapReduce jobs are easy to run.
3. Scalability – MapReduce can process petabytes of data which are stored in Hadoop Distributed File System (HDFS) in one cluster.
4. Speed – With parallel processing, MapReduce can take problems that used to take days to solve and solve them in hours or minutes. For instance, in July 2008, one of Yahoo's Hadoop clusters sorted 1 terabyte of data in 209 seconds, which beat the previous record of 297 seconds in the annual general purpose (Daytona) terabyte sort benchmark.

5. Recovery – Map Reduce handles failures. Due to redundancy in HDFS, if a machine with one copy of the data is unavailable, another machine has a copy of the same key/value pair, which can be used to solve the same sub-task. The Job Tracker keeps track of it all.
6. Minimal Data Motion – With Map Reduce, processes are moved to data and not data to processes. Processing normally occurs on the same physical node where the data resides. This is known as data locality. This reduces the network input/output patterns and contributes to the processing speed.

Despite the amazing benefits of Hadoop Map Reduce, there are some limitations to it. Some are listed below:

1. The development of efficient Map Reduce applications requires advanced programming skills and also a deep understanding of the architecture of the system. Analysts who are used to SQL-like or declarative languages may view Map Reduce programming model as too "low-level" because Map Reduce doesn"t require implementing relational operations such as joins.
2. Map Reduce has a batch nature. Data needs to be uploaded to the file system always and even when the same dataset needs to be analyzed multiple times, it still needs to be read every time.
3. The master node (where the Job Tracker is) has to be more sophisticated than other nodes because it can easily become a single point of failure.
4. Since Google has been granted patent, it raises the question of the long-term viability of using the mechanism in open environments.
5. The "One Way Scalability" of its design. Map Reduce allows a program to scale up to process very large data sets but constrains programs ability to process smaller data items.

7. CONCLUSION

Hadoop Map Reduce is a software framework or programming model for developing applications that process large amount of data in parallel across clusters of commodity hardware in a reliable and fault-tolerant manner. Hadoop Map Reduce works exclusively on <key, value> pairs. A Map Reduce job usually splits the input data set into independent blocks of data which are assigned to Map tasks (functions) in a completely parallel manner. The output of the map is then sorted and given as input to the Reduce tasks (functions) to produce the final result. Hadoop Map Reduce applications can be written in several languages. One thing is common for all of them – they must include the Hadoop library, and the programs must follow the same structure of having map and reduce functions or methods. Several companies are already making use of it such as Facebook, Yahoo, and Google etc. This is due to the benefits of using Map Reduce to develop applications such as the scalability, its speed, its simplicity, minimal data motion and others.

The Map Reduce model is a very efficient model for processing of large data sets. Currently, the interest for Hadoop Map Reduce is at its peak and there exist a lot of problems and challenges that still need to be addressed. The future ahead of Big Data is very bright, as businesses and organizations realize more the value of the information they can store and analyze. With the improvement and implementation of Hadoop Map Reduce, data processing will be as fast and efficient as never before and life would be made easier. Hence, it should be adopted by developers who need to develop applications that process large amount of data.

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Advantages and Challenges of Information Communication Technology (ICT) and Knowledge Management (KM) in Higher Education: An Overview

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Bhubaneswar, Odisha, India

ABSTRACT

Investigation was carried out through e-survey and library consultation. Study dealt with role, advantage and challenges of Information Communication Technology (ICT) in higher education and ICT and knowledge management (KM). The critical review of research literatures suggested diversified views and definitions of the knowledge lead to different conceptualization of KM and ICT in higher education in Indian context. KM processed knowledge acquisition, creation, storage and application while information followed the socialization, externalization; internalization in ICT integrated mode to assure long lasting value of higher education for qualitative knowledge based (K-based) economy. This may help in building competitive advantage, internationalization and intellectualization improving quality, efficiency and effectiveness in higher education for economic and social development of the Nation. Considering its importance during past two decades efforts have been made to investigate the relevant aspects, but published literatures on the above subjects are mostly theory based conceptual and/or review oriented papers. It lacks empirical database researches and most of the available investigations on ICT, Knowledge Management (KM), ICT and KM in higher education pertain to abroad. Even theory based conceptualized publications and review papers on the above aspects in Indian context are scanty and scattered. In view of its importance for improving k-based National economy through cost-effective ICT based KM globally, it seems worthy to investigate comprehensively in order to create and analyze the perceptual data base that would lead to policy advocacy for improving ICT and KM in higher education of the country and accelerating the ever growing digital talents for cost effective National economy.

Keywords: ICT, Knowledge management, Higher Education, Globalization, Knowledge based Economy

INTRODUCTION

Indian higher education institutions/universities are complex. In an era of K-based society country's holistic development may be obtained using most recent innovative technological tools (Jonson, 2012). The universities have to produce graduates, post graduates and research scholars of quality to build a k-based society (Mohayidin et al., 2007). However, their challenges of crowdedness, emergence of greater accountability, globalization of the knowledge economy, commercialization and advances in ICT are identical. In a changing education it has compelled them to adopt client oriented sustainable

educational institutes (Till, 2003). The higher education reform could not take off without ICT. (Lishan Adam, 2003). Currently students are transformed into a ―Net-Generation‖ (Tapscott, 1998). They learn information quickly with multi-tasking information access. While learners have low tolerance of lectures; rely on ICT and becoming more mobile. With the time, educational systems have to be modified in accordance to new needs and changes of people, society, and economy. (Adil Laoufi et al., 2011). This requires higher education reforms in India by developing new models of its intellectual capital using ICT (Tapscott, 1998). Because, in the existence of those elements university functions normally to promote better knowledge communication (Adil Laoufi et al., 2011).

In digital society of today there is an increasing trend of lifelong learners. To keep pace in recent developments, they integrate new knowledge with ICT (Plomp et al., 2007). Hence, the higher education becomes more important for increasing new ideas, productive skills, social interaction, employment and earning power (Kozma, 2005). The various kinds of ICT have relevance to education (Sanyal, 2001; Sharma, 2003; Bhattacharya and Sharma, 2007) in diversified ways and means (Kozma, 2005). ICT can play vital role in strengthening research, service to thecommunity and teaching to meet the higher education mission (Balasubramanian et al., 2009). In era of fast change in higher education with the integration of ICT the Nation can built talented society in order to enhanced growth. There is steady and expanding demand of ICT for higher education in developing countries for cost effective improvement of quality education. In education circles, ICT can be used for working more in less time for teachers and students in providing quality as well as quantitative educational contents (Lishan Adam, 2003; Neeru Snehi, 2009). Of late, the students are digital natives. Their approaches in using various ICT tools are different. The teachers are digital immigrants. They have to understand the recent ICT and KM for better impart of knowledge for learners of digital natives.

Satellite Instructional Television Experiment (SITE) is developed in 1975-76 (Neeru Snehi, 2009) for school oriented programs production and transmission. As nodal agency UGC has created Educational Media Resource Centers (EMRCs) and Audio-Visual Resource Centers (AVRCs) in many universities with ICT use for increasing access to quality education. Country has launched a satellite EDUSAT to promote ICT driven open and distance education in quantitative and qualitative learning (Neeru Snehi, 2009). In this regard Bhatia, (2009) states that only quantitative expansion is achieved and qualitative revolution yet to be achieved. In higher education e-teaching and e-learning is prompted with the transmission of e-content. However, there is challenge of generating and transforming e-content for e-learning for imparting teaching and conducting research (Lishan Adam, 2003). According to Mohayidin et al. (2007), the computer-based technology communications complement traditional storage and delivery methods and improve knowledge delivery efficiency.

Considering ICT significance and KM in higher education, attention of various investigators has been attracted towards the role of ICT on the different aspects of higher education such as on ICT's role, advantages and challenges, KM in integrating ICT in higher education etc either in isolation or in combination of different aspects. However, most of the literatures are on the concept and review papers and that too foreign country based research. In Indian condition publications are scattered and scanty. The present investigation is an overview on the roles and advantages of ICT and KM in higher education. It would be useful to policy makers, planners, higher education institutions, researchers, teachers, scholars and students in more than one ways in improving higher education to strengthen knowledge based national economy.

METHODS

Study was carried out during 2012-13 at ICT Cell, KIIT University Bhubaneswar, India. Relevant information was gathered through e-survey of literatures published during last two decades and the resources available at Library of KIIT University, Bhubaneswar, Odisha. Publications were categorized into:

i) Role of Information Communication Technology (ICT) in higher education ,
ii) Advantages of ICT integration in higher education,
iii) ICT challenges in higher education and
iv) ICT and KM in higher education

Category wise papers were reviewed, analyzed and compiled briefly to generate further researchable issues in the field of Information Communication Technology (ICT) and Knowledge Management (KM) for improving higher education in the country.

RESULTS AND DISCUSSION

Roles of ICT in higher education:

As per Blurton (2002) ICT may be defined as ―various set of tools of technology along with diversified resources in order to communicate, create, disseminate, store, and manage information‖. Different investigators have expressed variable roles of ICT. Mlitwa (2007) links these terms to ICT knowledge. As a tool ICT has to advance knowledge. ICT tool enhances problem solving capabilities of man. With the help of ICT tool students acquire knowledge. It helps teachers to accelerate teaching and learning. Uses of ICT in higher education reduce costs (Ozdemir and Abrevaya, 2007). According to Ozdemir and Abrevaya, (2007) ICT provides affordable and accessible higher education whereas, Fluck, (2003) Thune and Welle-Strand (2005) and Ozdemir and Abrevaya (2007) point out its role in

increasing enrolments. Thune and Welle-Strand (2005) opines that ICT increases student mobility. ICT also meet the needs of off- shore learners (Bhattacharya and Sharma, 2007). It effects the modus of course operand in teaching and learning (Thune and Welle-Strand, 2005; Casal, 2007; Mooij, 2007; Ozdemir and Abrevaya, 2007). It gives superior quality skills and collaboration (Bhattacharya and Sharma,2007). It increase program flexibility (Oliver, 2002) and generate competition among institutions for need based improvements (Lim and Hang, 2003, Kozma, 2005; Ozdemir and Abrevaya, 2007).

International Association of Universities (1998) and Thune and Welle-Strand (2005) express that ICT plays an important role in tackling accelerated crowdedness, diversification, internationalization and marketing issues in advanced studies. ICT use changes the mode of businesses management. It also affects the work, interaction and function of people in society (Bhattacharya and Sharma, 2007; UNESCO, 2002). McGorry (2002) and Kirkup and Kirkwood (2005) suggest that ICT is very common everywhere starting from home to work place and internet use is increased significantly. Globally many nations depend on ICT to tackle various issues of higher education. This drives the national economy (Mehta and Kalra, 2006). There is an increasing demand of competent human capital to mitigate the economic crisis (Purwadi, 2001). Postiglione (2009) states that in some country higher education serves knowledge and human capital repositories in order to overcome the various issues.

ICT is used everywhere within higher education in order to improve teaching and learning to promote research, engage talented scholars and administration as opined by Balasubramaniam et al (2009) and Jaffer et al (2007). Researchers refer ICT use in higher education as educational technologies (Czerniewicz et al., 2005). It is used as learning technology in e-learning online teaching (Van der Merge and Moeller, 2004) and e-learning contents (Smith, 2004). It is used as communication technology (Blanchette and Kanuka, 1999). ICT is also utilized for web-based learning (Czerniewicz et al., 2005), hybrid learning (Thune and Welle-Strand, 2005) and virtual learning environments (Kirkup and Kirkwood, 2005).

In general universities emphasize on course content centering the textbooks. Education is imparted by giving lectures, tuition and assignments (Oliver, 2002). But, in modern pedagogical education with integration of ICT encourage curricula by increasing competency and performance. Traditionally, learning is student-centered whereas, students have to have confidence in communicating, interrelating, reflecting and resolution etc (Forde, 2007). ICT integration in education results shift from faculty-centered information communication to learner-centered responsible knowledge gain (Hattangdi and Ghosh, 2005). In digital era thelearning is increasingly inquiry-based and problem-centered. Teachers

work as facilitators, coaches and mentors with the support of ICT (Oliver, 2002). ICT creates the learning environment to move beyond behaviorist learning theories. In constructivist hypothesizes the learning is completed through active knowledge construction (Duffy and Cunningham, 1996). Under this learning the social interactions are very important (Vygotsky, 1978). Here the students gain appropriate knowledge and generic skills. With the growing use of ICT the graduates need to have information literacy. According to McCausland et al, (1999) information literacy is the ability of identifying the relevant issues followed by identification, locating, analyzing and evaluating required information to mitigate the issue and challenges.

Traditionally, learners require completing their tasks within a specified time-frame and settings. Students hardly put any question on the programs and its delivery. But in digital era, the higher education is offering flexible choices need-based quality learning (Moore and Kearsley, 1996). Now ICT is playing a significant role in distance education programs for higher education. Higher education e-learning is not confined to schedules and time tables and facilitates the participation of large number of learners without time constraints (Hattangdi and Ghosh, 2008). ICT use in higher education encourages learning through work experience (UNESCO, 2002). In this type of learning, students enable access to contents and courses with the help of ICT at their workplace on a need basis.

During last two decades ICT develop very fast. This brought large changes in different industries and influenced the methods of interaction and work of man in society (UNESCO, 2002; Bhattacharya and Sharma, 2007; Chandra and Patkar, 2007). ICT may mitigate the constraints of poor quality education at national level. ICT tools may also mitigate the problems of high capital, inadequate teachers, low quality education, time and distance barriers (McGorry, 2002). High proportion of Indian population (over 1.25 billion) is young. They need to be educated using modern ICT tools in order to bridge the gap (Amutabi and Oketch, 2003). Innovative use of ICT can potentially solve the problems.

Advantages of ICT integration in Higher Education:In generation of digital resources (digital library) the ICT play a crucial role. This is easily accessible to learners and teachers for research-and course-materials (Cholin, 2005; Bhattacharya and Sharma, 2007). IT allows networking for sharing scholarly materials by avoiding work duplicity (Cholin, 2005). In higher education ICT provides quality skills so as to solve complex problem through all round collaboration (Mason, 2000; Lim and Hang, 2003; Bottino, 2003; Bhattacharya and Sharma, 2007). It improves the student's knowledge perception throughout the world. From the above accounts it may be pointed out that for preparing digital workforce for improving global economy the ICT plays a crucial role (Kozma, 2005).

ICT based learning is advantageous for eliminating time barriers as well as geographical barriers in education for learners and teacher (Sanyal, 2001; UNESCO, 2002; Mooij, 2007; Cross and Adam, 2007; Bhattacharya and Sharma, 2007). A synchronized teaching and learning process in higher education is completed by thoughtful creative interactions (Sanyal, 2001; UNESCO, 2002; Bhattacharya and Sharma, 2007). With the use of ICT Increased collaboration becomes possible (Sanyal, 2001; Plomp et al., 2007; Bhattacharya and Sharma, 2007). An innovative approach using ICT may be used for enhancing quality and standard of higher education (Sanyal, 2001) for providing rapid transfer to the target groups (UNESCO, 2002; Chandra and Patkar, 2007). As per UNESCO (2002) and Bhattacharya and Sharma (2007) ICT can provide education combination maintaining balance in work life. An international dimension of educational service can be increased in time for non formal education (UNESCO, 2002). Higher participation and interaction is possible through e-learning in higher education. Over the internet, e-learning facilitates the delivery, dialogue and feedback. It also allows ease of access to need base modification of content and exams. Wishart et al. (2007) suggest that teaching methods like role- become easy in on line environment across time and distance through ICT use.

Web and Internet is the core ICT in e-learning for spreading education. In higher education digital identity of the students is created. It connects all the stakeholders and allows inter- disciplinary investigation as suggested by Chandra and Patkar (2007). Plomp et al (2007) point out that ICT utilization is motivating students and teachers whereas; Bottino (2003) and Sharma (2003) suggest that teaching performances are improved by using ICT. It facilitates learning through work experiences (Yuen et al, 2003). According to Casal (2007) ICT provides a platformfor sharing information and knowledge which hold great promise for future (Mason, 2000; Casal, 2007). ICT helps in increasing human as well as knowledge capital. For the development of society ICT tools play very crucial role (Casal, 2007). It may helpful in pedagogical, curricular and assessment reforms. By using ICT tools the faculty members and learners plan learning activities and take benefits from each other by idea interaction to create new knowledge. ICT enables the progress monitoring the societal knowledge information (Kozma, 2005; Bhattacharya and Sharma, 2007).

Use of ICT is cost effective for the students by reducing travel expenses. It tackles problems of more number of students (Fluck, 2003). As per Mooij (2007) the ICT provides higher reliability, more validity and greater efficiency. With the ICT use, the responsibilities may be transferred to students for self management which help individualize need-based teaching or guidance method (Mooij, 2007; Ozdemir and Abrevaya, 2007). According to Mooij (2007) different levels of information and educational setup can be linked with the help of registration, evaluation and administration through ICT

may offer education in the form of service (Bhattacharya and Sharma, 2007). It enhances mass e-learning as well as creates institutional competition in order to provide quality education (Cross and Adam, 2007).

ICT challenges in higher education:

Fast ICT growth and its use in higher education system face many challenges. Few challenges of ICT in higher education may emerge by asking the following questions. What are the course- contents and programs students have to learn, what are methods of learning, what is time when they learn, which are the places where learners learn, who are the new learners and teachers and how learning can be made cost effective? The research-based knowledge on the techniques of ICT use for improving the models, impart of knowledge and higher education management are readily not available. In the application of ICT in higher education the different states of India are at different stages of development. It is one of the major constraints to maintain uniformity in ICT utilization. The higher education systems have inadequate funds for maintaining quality education and preserving teachers to meet the satisfactory social needs (Boeren and Maltha, 2005; Lee and Healy, 2006). Ever increasing enrolment of the students, new knowledge emergence, ICT advancement, globalization, economic restructuring, financial constraints etc, contribute in reforming higher education (Hattangdi and Ghosh, 2008; Shin and Harman, 2009; Welch, 2011).

Increased access of graduate and post graduate students results massiveness in higher education and this is one of the crucial factors for global higher education development (Altbach, 1999). Higher education systems are also influenced with it (Lee and Healy, 2006; Welch, 2011). Bates (2001) suggests that k-based economy demands ―technology-ready workers‖. Due to use of ICT in routine tasks, there is an enormous pressure on educational institutions to produce ICT workers by the governments and business communities. However, Mumcu et al. (2004); Ojo et al. (2007); Isman, et al., (2010), opine that on work-place there is inadequacy of ICT infrastructure which is one of the major limitations in using ICT because a robust ICT infrastructure is prerequisite in higher education for k-driven development. With the development of new technologies, the higher education systems must be advanced in knowledge and skills. It is very important that universities in region should be equipped with industry-ready skilled and knowledgeable students for competitive global economy. Though for all the challenges, ICT is not a panacea, but it has positive learning impact (Jaffer,Ng'ambi and Czerniewicz, 2007). Education is prerequisite for the socio-economic advancement of the nation (Mehta and Kalra, 2006). Therefore, for ensuring good quality, easy accessible and affordable higher education, it seems necessary to be innovatively integrated with ICT to produce ―technology-ready workers‖ in the nation (Hattangdi and Ghosh, 2008).

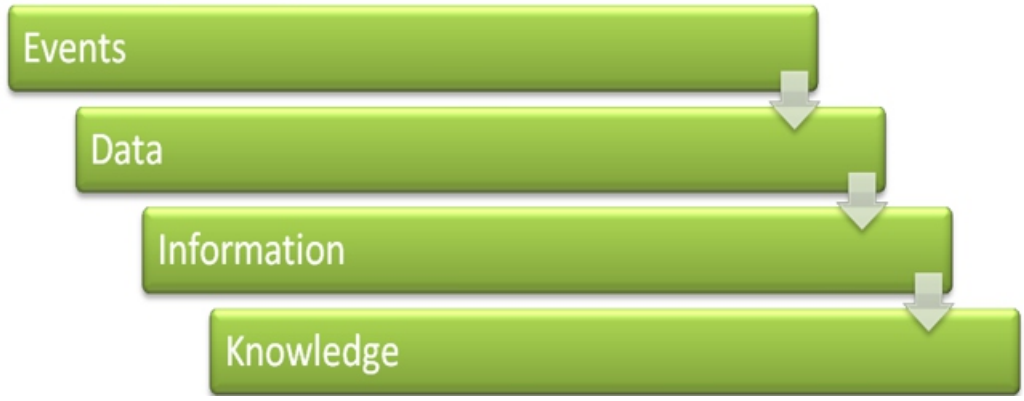
Currently, focus is given to use ICT by faculty members and to impact of ICT use in higher education (Keengwe and Anyanwu 2007). Though ICT is prevailing in education, but it is not intensively used in teaching and learning activities (Grabe and Grabe, 2008). In most of the cases new and complex ICT tools are bought and kept with teachers. Because, there lacks suitable supportive infrastructure for adaptation and integration with KM (Jonson, 2012). Real technology operators are generally engage in inquiry about the technology (Hall and Hord, 1987). Hence, before implementation of ICT device it necessary to conduct pre-assessment to find out organization's proper equipment with supportive infrastructure, human resources and structure to enable technological innovation adoption (Jonson, 2012). Then gap analysis need to be done in order to identify intervention points for ICT integration in KM in higher education. Previously, teachers were not integrating ICT into their practice due to lack of an appropriate training or access to technology (Clarke & Robinson, 2005). Research has shown even when teachers have access to training and technology, they still do not, in any significant numbers, integrate technology into their teaching (Ertmer, 2005; Mueller et al., 2008). This trend has led researchers to consider that low levels of ICT-related change in higher education. Risk theory offers a way to examine these types of cultural interactions, by providing a useful conceptual framework for understanding ―why things have gone wrong‖ (Lupton, 1999); but, risk perceptions are not only about negative results or fears but also it can be in the form of positive exploration, with potentially questionable results. Research findings indicate non availability of skilled workers (Agarwal, 2006). The socio-cultural, socio-economic and geographical limitations are still in existence for learner in higher education (Bhattacharya and Sharma, 2007). Research shows that most of the institutions could not completely full fill the requirements of Generation Y employees with the afforded opportunities by Web 2.0 technologies (Burkinshaw and Pass, 2008). In higher education ICT use for KM is an emerging issue. It needs innovative approach of research to address the emerging issues.

ICT and KM in higher education:

Challenges in ICT integration in higher education need to be addressed through appropriate KM in the educational institutes to improve the quality, efficiency and effectiveness (Hawkins, 2000). It gives solutions for the management, organizational behavior, retrieval of information and artificial intelligence (Adil Laoufi et al., 2011). The University Grants Commission (UGC) maintains quality in Indian higher education institutions. UGC is responsible to maintain teaching, examinations and research standards and quality of colleges and universities. UGC also conducts the National Eligibility Test (NET) for high teaching standards. It is done to improve higher education quality. In this, ICT works as a hub. According to Hameed (2006), Aldridge (2008), Shaikh (2009) and Aypay (2010) ICT has significant role in higher education, over all development, generation of employment, improving economic growth, providing governance and administration, reducing poverty, community

engagement, efficient research activities and knowledge society's emergence globally. Many researchers like Ng et al. (2006), Kong and Li. (2009), Shaikh (2009) and Masood (2010) suggest that globalization of knowledge-basedeconomy are due to individual's ability in information dissemination. For KM process capturing, abstracting, codifying, organizing, storing, diffusing, reusing, transformation words are commonly used. ICT infrastructure and supporting software manages existing explicit knowledge. An event creates data, data generates information and information creates knowledge (Fig.1). Creating knowledge from data signifies a process of extracting information from data and ICT serves as an enabler for transforming knowledge into profitable products. ICT can increase the flow of knowledge offering modern systems and enabling support for sharing knowledge. Whereas, the theories approach method for soft track are people-focused enabling a __good" space (Nonaka and Takeuchi (1995) and Sveiby (1997)

Fig.1. Knowledge creation.



As per Holsapple (2005) KM can't be separated from ICT. Some scholars (Boisot, 1998; Leonard and Sensiper, 1998) also tackle specific professional issues in KM point of view by synthesizing hard as well soft aspects. They take KM as an effective integration of human, ICT and processes. Hence Jackson (2005) has created a holism approach to draw complete KM development picture as also suggested by Gao et al. (2003) and Gao and Li. (2003).

According to Shaikh Faheem Gafoor and Quazi Khabeer, (2013) the accreditation does not replace the system of degree and diploma awards by the Universities. It provides quality assurance of the academic aims. The ICT is the need of the hour for quality assurance in higher education as it fastens the process of assessment and audit with greater transparency (Shaikh Faheem Gafoor and Quazi Khabeer, 2013).Further, ICT-rich higher education institution gives a competitive advantage in recruiting students. ICT are used extensively for supporting powerful, efficient management and administration in educational administration (Christiana Maki, 2008; Ben-Zion Barta et. al., 1995). Sharad Sinha (2008) predicts diversified challenges for Indian education system in 21st century. According to Hossein Zainally (2008), ICT offers several facilities for administrators in education system to handle the given

tasks with responsibility. Ashish Kumar and Arun Kumar (2005) highlight that in recent time the ICT is used as a techno-management tool to provide the benefit to Indian higher education institutions. According to Gumala Suri (2005) the universities are increasingly changing with the development of new ICT. Due to application of new ICT in University there is a significant shift in higher education (Krishnaveni and Meenakumari, 2010). However, data based research records are lacking on this aspect.

ICT accelerates the information and knowledge dissemination to become integrated into global networks. As per Ashish Kumar and Arun Kumar (2005) the ICT use in education there is a positive perception. The introduction of ICT based KM technologies are virtually recent practices but it is deprived of a holistic perspectives (Galliers and Baets 1998). Although diversified resource-and client-specific ICT based KM technologies (Omona et al. 2010) have been developed for integrating in higher education KM, but there exists a yawning gap between its advancement and need-based adoptions due to various bio-physical and socio-economic limiting factors need to be addressed.

Shaikh and Khoja, (2011) determine various issues and challenges while integrating ICT in higher education system and examines its coping mechanisms with the challenges of implementing ICT. In ICT-based knowledge society it is essential to have skilled workers, government support with sound ICT infrastructure to use ICT efficiently (Czerniewicz et al., 2005; Alev et al., 2009; Chowdhury, and Alam, 2009). Shaheeda et al. (2007), Jayson (2008), Shaikh (2009) and Yusuf and Afolabi, (2010) have reported that ICT helps in higher education systems to produce own knowledge societies for improving learning quality with better educational outcome. Several researchers (Khan, and Shah, 2004; Hameed, 2006; Amjad, 2006; Shaikh, 2009; Iqbal, and Ahmed, 2010) have pointed out that for achieving success in education, employment and everyday life, this century needs efficient ICT use in every field with confidence. Many researchers (Chung, 2001; Derek, and Dahlman, 2005; Ng et al., 2006; Teo,2009) claim that world economies become more competitive and interdependent due to integration of ICT. In many studies (Ng et al., 2006; Gillard et al., 2008; UNESCO, 2008; Shaikh, 2009; Balasubramanian et al., 2009; Vajargah and Jahani, 2010; Erkunt, 2010), the investigators have pointed out that in addressing the challenges of ICT integration in KM the policy makers and teachers have crucial role to play. The effective use of social software in higher education has shown growing interest (Minocha, 2009) in adopting virtual learning environments (VLEs) incorporating wikis, blogs, forums and chat. Currently, the Face book, Google, Docs, Delicious, Flicker etc. are also used in higher education.

There are over 1346 and 1244 engineering colleges and polytechnics respectively which have been approved by All India Council of Technical Education (AICTE) as stated by Krishna (2007). Further,

many more are establishing with the times. For getting approval by AICTE the existence of ICT infrastructure engineering colleges is prerequisite. These institutions are very important technology park management (Krishna, 2007). ICT professionals act as broker for knowledge of the institutes (Pawlowski and Robey, 2004) while, users of the ICT are considered as actors in adapting and adopting knowledge systems (Lamb and Kling, 2003). Firm-level knowledge integration researches are people inseparability in knowledge integration processes (Leonard-Barton 1995; Nahapiet and Ghosal 1998), role and limitations of technology (Argote and Ingram 2000; Stokes and Clegg 2002) and impact of firm level integration capacity (Kogut and Zander 1993; Nonaka and Takeuchi 1995). According to Leonardi (2007) the way of knowledge creation, modification, transmission and storing are performed with ICT.

Omona et al. (2010) report conceptual framework of ICT use to enhance KM in higher education. According to Yeh (2005) and Omona et al. (2010) ICT adoption in KM need to create new knowledge technologies processes to promote effective KM in higher education. For effective KM, institutions required to maintain efficient KM framework. Allee (1997) points out that the KM framework includes integration of organizational knowledge, information and technology infrastructure and store experiences. Von Krogh et al (2001) have suggested that persons may successfully achieve the goals of higher education in learning organization (Mellander, 2001) using effective KM procedures. As per Baskerville and Dulipovici (2006),pre-existing theories understanding of need based KM is important for effective use of ICT in higher education.

Choenni et al. (2005) approach cognitive and community approach of KM. In cognitive approach of KM capturing, analyzing, developing, creating, organizing and sharing knowledge using ICT tools are the main characteristics. In community approach, effective communication, social interaction and collaboration are focused in KM. Hansen, et al. (1999) have expressed that the codification KM deals with computer and ICT capture, store, disseminate and reuse the knowledge. The evidence confirms that higher education by and large is an industry. It leads towards substantial impact on e-based national knowledge economy as well as effective to GDP (Kelly, McLellan, and McNicoll, 2009).

CONCLUSION

Above review indicated various roles, advantages and issues of ICT and KM in higher education. ICT is various technological sets which are used to communicate, create, disseminate, store and manage information. It is the current need for quality assurance in higher education. The significant challenges in higher education have emerged due to developing change in ICT with time. ICT facilitates teaching, research, and lifelong learning for higher education. In India the higher education system provides

quality higher education, rapid development, employment generation, effective administration, livelihood improvement, community engagement and effective research global economy. Education is prerequisite for the socio- economic development. In digital age of today universities must produce adequate numbers of digital students equipped with recent knowledge, and skills to meet competitive market needs for global economy. ICT play a significant role in knowledge capturing, analyzing, developing, creating, organizing and sharing for social interaction, communication and collaboration. It is essential to develop accessible and affordable education for everyone utilizing ICT. Production of technology-ready workers is essential for knowledge-based economy. Governments and business communities are pressurizing universities or using ICT in routine tasks regularly.

Comprehensive investigation to create database regarding ICT in KM in the perceptions of teachers and learners for the Indian Universities and Institutions are required in order to develop need based efficient models for improving the teaching and learning in higher education at global level. It may enhance the understanding of practices and perceptional efficiency of ICT mediated KM in higher education. In order to mitigate relevant issues recommendations are to be made useful to policy makers, planners, higher education institutions, researchers, teachers, scholars and students in more than one ways in improving higher education to strengthen knowledge based national economy. However, data base creation is prerequisite from diversified educational institutes as well as from teachers and learners for further improvement in knowledge-base National economy. Currently the ICT in KM is on the threshold of digital era. There is an urgent need of the new conceptual research approach to address emerging challenges involving stakeholders, faculty, administration, trainers, and students. However, existence of an appropriate ICT infrastructure in universities is prerequisite to provide support for continuous update of the professional efficiency of teachers to cope with the challenges for development in ICT and KM.

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Dynamics of Workplace Communication: A New Age Model

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A B S T R A C T

The objective of this paper is to focus on how digital technology, more specifically social media, has resulted in a paradigm shift in the basic model of the process of communication. The traditional communication model, which explains relationship between the sender, medium and receiver and the feedback, may have become obsolete with the advent of a more complex communication channel called internet and its various communication tools. The linear broadcast model of communication is fast being replaced by a multidimensional model of communication using the social media. Many new barriers of communication and challenges have emerged due to social media"s inclusion in communication. As social media becomes the favored mode of communication, due to its extensive reach, workplaces cannot remain unaffected by its use. As a result there is information and communication overload and formal channels and boundaries of communication are becoming obsolete. Although stated as a boon for communication, its impact on workplace communication cannot be termed as positive alone. There have been many adverse effects impacting office communication and creating new barriers of communication. The revolutionary change has created need for a more dynamic model of communication.

Keywords: social media, barriers of communication, work places

Key points: *Social media intrusion causing paradigm shift in basic model of the process of communication.*
New age office communication and its effect on work culture
Communication deadlock due to internet causing information overload
Changing dynamics at office communication due to social media

I. INTRODUCTION

Technology has entered every sphere of our life and communication is no exception. The communication process is constantly evolving bringing with it new opportunities and challenges. Many researchers have identified the landmarks in the evolution of communication as a result of invention of language, writing, printing and digital technology. Sheoran (2012) in his study, mentions the noteworthy inventions in means of communication which include drawing, printing, telegraph, telephone, radio, photography, television, cellphone, digital technology, digital marketing, including social media.

Modern day communication is characterized by speed, increased accessibility, ever changing technology, multiplicity of channels, new emerging jargon, specialized training and technological glitches. Social media and Chat applications like Whatsapp, Facebook etc have transformed the ways in which we relate to other people in workplace. We see, in these media, a powerful set of tools to reinvent Communication. Social media and applications are pervading not only our private lives but our work lives too. With almost everyone accessing the internet every day or almost every day, whether it's at home or at work, it seems unlikely not to use the medium to its full potential including communicating with colleagues at workplace.

SOCIAL MEDIA INTRUSION

Social media offers a great opportunity to communicate with colleagues in a way that helps increase greater affinity. Undeniably, on one hand these „Real time Communication"facilitate the communication process but on the other hand they are throwing up new challenges and creating new barriers.

Social media is really changing the way people communicate with innovative ideas making its appearance on almost a daily basis. Earlier absence from the office might have meant a break in office communication but that is clearly not the case anymore. People have access to social media 24*7 thanks to smart mobile phones. All of this is creating an environment of constant communication, social affinity and consistent interactions. This environment may also create subjectivity for the type of information they receive, when they receive it, and how they receive it. Social networks connect individuals and communicate interests and activities and this could result in certain information getting public which was best kept confidential. The latest controversy over Facebook making private information, which is shared on Whatsapp, public, is just one example.

One of the greatest dangers with social networking sites in relation to the disclosure of confidential information is that employees forget how „public" it can go and what responses it may elicit. In addition, the very nature of many sites is to encourage participation in the „on line" conversation, where an exchange of views or information can feel like a private discussion but is in fact available for all to see. In the circumstances, there is great scope for the accidental disclosure of confidential, private information.

BARRIERS TO COMMUNICATION

It is clear that there is more to this „hip" communication than what meets the eyes. Although, one can"t deny the advantages of these communication delights, one must ponder over the so called hazards of

communication, through social media, and its effects. Although known for creating a more amicable and friendly communication environment, could it be impeding communication? A closer look will expose a magnitude of problems that advent of social media could be posing at workplace. It may be dividing people instead of uniting them. It may be creating newer psychological and cultural barriers in communication and creating unseen, unheard of hurdles in natural flow of communication at the workplace which was earlier formal and structured. Formal means of communication like memos, notices and official correspondence could have been a slow and sluggish way to communicate but the chances of mis communication and misunderstandingcould be completely ruled out from them. Informal channels of communication which are gaining popularity due to social media emergence have been instrumental in making communication more dynamic. It is breaking the class ceiling by crumbling hierarchies, by breaking boundaries and by bringing everyone in the domain of communication.

REVIEW OF LITERATURE

Social media is considered a boon as a tool of communication due to its wide spread reach. Not only the social interactions but also workplace interactions are gradually getting dependant on it. However, as it is strengthening its stronghold in workplace communication people are also waking up to its negative implications. Businesses embraced social media mostly to communicate benefits to their employees without realizing that any tool meant for social interaction will have consequences which may have distant indirect impact on workplace culture. Businesses identified the main benefits of using social media as; brand building, fostering collaboration and communication, as way of recruiting new talent, improving employee engagement and driving innovation. (Trott 2014).In the same opinion paper, many perils of social media are also mentioned like time waster, leaking confidential information, recruitment risks, management-employee relationship etc.

Exon (2010) commented on invasion of privacy by business houses through social media. The unfortunate part is that participant on social group are not aware to what extent the privacy is invaded upon and what are its consequence.

According to Kaplan and Haenlein (2010) the revolutionary trend of social media has grown substantially since 2008 and is not slowing down anytime soon; sharing anything from daily thoughts, feelings, observations, as well as photos and video on a daily basis has become the new norm amongst the social media generation. Introduction of smart phone has further popularized social media for uploading and sharing information.

Daft and Lengel (1986) propounded Media Richness Theory which talked about effectiveness of communication through media and media as a tool to remove ambiguity due to the social presence it allows. Kaplan and Haenlein (2010), have discussed its implication on the society and its role in changing norms in the society. They quoted the example of Twitter, which has a total word limit of 140 characters that makes it crisp and abrupt. This trend can roll over to verbal communication in society which may be judged as rude and disrespectful.

Social media has created an environment in which we have an abundance of weak ties with various networks of people, yet have devalued some of the close tie relationship characteristics such as face-to-face interaction, quality time, as well as respect. This reflects a dangerous trend that signifies people judging each other through their media profile before a face to face introduction. (Pezolla 2013)

Kane et al. (2014) emphasized on the behavioral aspect of social media and stated that due to social media‟s rapid adoption and widespread use of these tools even relatively minor technological differences may result in profound theoretical consequences for individual and organizational behavior. In another study, Shrivastava (2012) brought out the challenges that new technologies have posed on communication.

The above mentioned studies have shown some of the negative aspects of social media. The behavioral, cultural, psychological effects are going to directly impact the communication in an organization.

OBJECTIVE

Business houses are blindly following social media due to its extensive reach and influence on people. Although, it cannot be denied that social media has proved to be a very useful tool in conveying any message across to millions of people its negative impact is gradually being noticed.

This paper focuses on how digital technology, more specifically social media, has resulted in a paradigm shift in the basic model of the process of communication. Many new barriers of communication and challenges have emerged due to social media‟s inclusion in communication. The researchers go on to propose a multidimensional, multidirectional model of communication which is of relevance while communicating using the social media.

The said objectives have been achieved by carrying out an extensive literature review and personal interactions with experts from the corporate who are witnessing the social media invasion into the workplace factually every day. No specific industry was targeted for carrying out this survey as this is an

untouched exploratory work. However, the next phase of the study would involve carrying out an industry specific and empirical validation of the model proposed in the study.

PARADIGM SHIFT

The traditional communication model, which explains relationship between the sender, medium and receiver and the feedback, may have become obsolete with the advent of a more complex communication channel called internet and its various communication tools. The linear broadcast model of communication is fast being replaced by a multidimensional model of communication. Now, the effects of a simple message sent by an unsuspecting sender will have multitude of responses, from myriad people of varied personality types and perceptions, all due to the latest smart chat applications. Personal communication has a new meaning now. People are communicating with groups instead of a single person. As was expected, workplace has not been unaffected with this change. There are informal work chat groups with no official sanction or defined aim/common objective. People are added into these groups with no specific intention. The commonality in these groups can be as vague as the same organization. People from different verticals may fall into these groups and inadvertently become part of some communication with no relevance for them.

As is common with social sites, these applications also become the platform for sharing personal information, plans, moods, news, views etc. Social and professional protocols have no meaning for these applications. The result could be a plethora of communication, interpersonal and professional problems. This may be giving rise to disputes and conflicts beyond communicational redemption. Most unfortunate part would be ignorance towards these conflicts. The party to disputes may not even know there is a problem and the problem may remain unresolved, giving rise to even greater conflict. This would be mainly because a misunderstanding created here will never find an explicit vent due to presence of many people in the group. The conflict would be not in the visible form but will take the shape of poor judgment, bias, misunderstanding, clash of opinion, jealousy and anxiety. People are not prone to discussing these psychological components of nature especially in a group. A group chat has constraints like time, technical impediments, presence of large number of people which impede communication and results in matters remaining unresolved.

Examining the above in a workplace scenario will surely prove the hazardous implication of social media intrusion in professional relationships. People have neither time nor will to resolve personal conflicts at work. But these unsolved conflicts can result in poor communication, lack of understanding, interpersonal problems thereby causing greater implications like loss of productivity, rise in attrition rate, crumbling hierarchies, poor workplace environment.

A new framework of the consequential effects of social media on communication will show the barriers it has created in the new age communication. Figure 1. shows the new model for the process of communication relevant to social media.

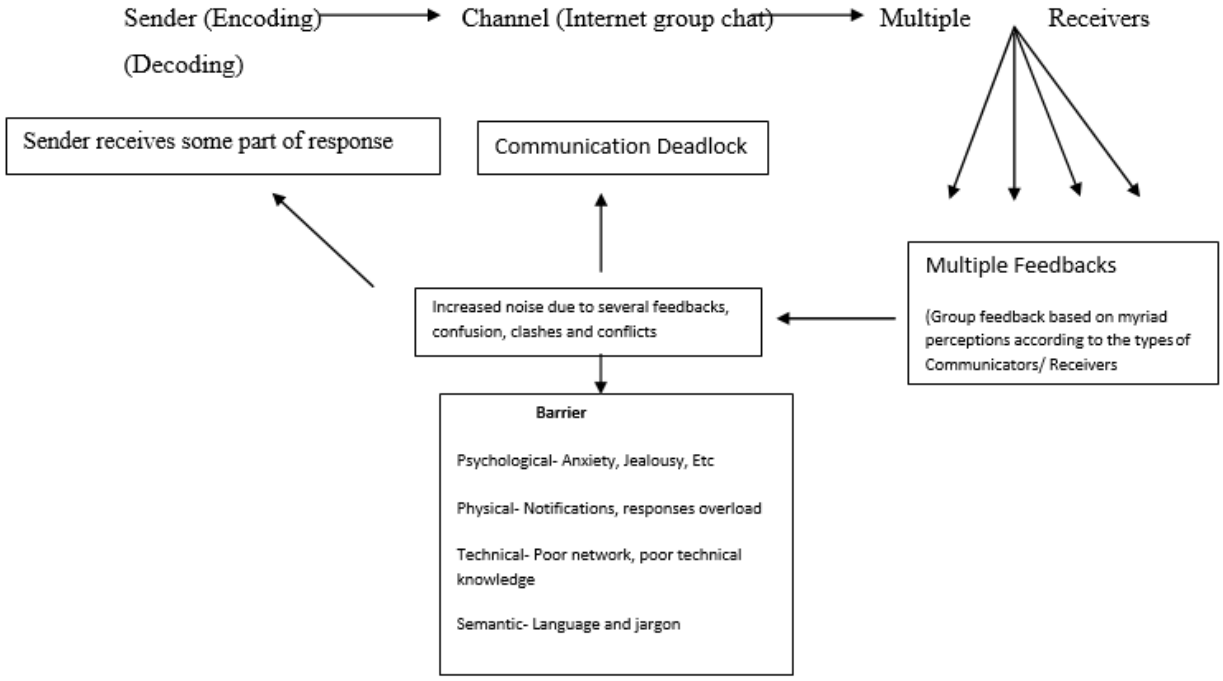

Fig. 1 (Multidimensional model of social media communication)

NEW AGE BARRIERS

It is imperative to understand the indirect implications of using social media especially at workplace. There can be a lot more than meets the eyes. We did not realize how and when it crept into office networking. The indelible line which should have been drawn to mark checks and boundaries got deleted before it was even marked. Social media‟s unstructured communication and storage opens organizations to additional liability and loss of trade secrets. Social media tools are a double edged sword that could create inefficiencies and diminish intellectual property. (Templin 2012).

We define social network sites as web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system. The nature and nomenclature of these connections may vary from site to site (Boyd and Ellison 2007).

As per Wikipedia “Social media are computer-mediated tools that allow people or companies to create, share, or exchange information, career interests, ideas, and pictures/videos in virtual communities and networks”. The Merriam-Webster dictionary defines social media as “forms of electronic

It is a known fact that communication is the mother of all that goes around in the world. In recently published news in Edmonton Journal, Social media was blamed for 80% increase in gonorrhea among residents of Alberta. The stats in Alberta were troubling as according to Edmonton Journal, there were 82 Gonorrhea cases per every 100,000 Albertans in 2015, the highest rate since 1980. Same was the case with Syphilis, the cases of which have doubled too. Twitter, the social media chat tool, was quoted as the culprit. The reason was anonymous sexual encounters with strangers people met through social media communication. There is the increase in STIs because it is difficult to later contact partners for follow up testing and treatment. (Source: Gizmodo.com)

This news piece is a very valid analogy to substantiate our point although it may not directly show its effect on communication. We will now therefore, elaborate our point by examining social media‟s effects and see how the old definition of communication barrier is finding new meaning in the current scenario.

PHYSICAL BARRIERS

Physical barrier is the environmental and natural condition that disrupts communication. Physical barriers like doors, walls, distance, etc. do not let the communication become effective. The barriers are less if the proximity of the sender and the receiver is high and fewer technologies are used. Disturbance in hearing due to thunders, telephone call disconnection, problems in television reception, message not being sent in chat, etc. are some examples of physical barriers of communication. Any number of physical distractions can interfere with the effectiveness of communication, including a telephone call, drop-in visitors, and distances between people, walls, and static on the radio. (Fred 2010). The new age physical barrier is „Notification“. All chat applications come with notification alerts and are a constant disruption in communication. Once a notification has been received by a receiver there is a compulsive urge to attend the virtual conversation. The receiver is mentally transported from the present to virtual and loses connection with the current conversation. This could happen in the middle of a meeting or during the resolution of an existing conflict.

PSYCHOLOGICAL BARRIERS

Psychological barriers such as fear, lack of confidence, anxiety etc are the greatest deterrent in communication. Researchers have associated social media with stress due to overflow of information - much of it distressing and challenging. It is easier now to track what friends, enemies, and foes are doing and to monitor raises and falls in status on a near-constant basis. There is more social pressure to disclose personal information. These technologies are said to takeover people‟s lives, creating time and social pressures that put people at risk for the negative physical and psychological effects that can result from stress (Hampton et al. 2015).

Social media has many ways to attack people‟s psychology and thus causing psychological barriers in communication. Follies of human nature are accentuated when the information is forced upon them and there is no way to block or escape that information. Some direct outcomes of social media and its indirect effects on communication are discussed in the following paragraphs:

I) Perception

Perception has been majorly effecting communication. Listening, understanding, assimilation and responses are influenced by perception. The perception barrier is so potential that it can change the whole meaning and sometimes it can alter it to the extent which is not intended by the encoder at all. The perception of each one of us is so different that it can result in different and multiple interpretations of the same incident due to which perceptual barriers occur (Shrivastava 2012).

A sender‟s message on a social media tool will meet several perceptions thus causing communication stalemate. There are grave chances of miscommunication. One man‟s understanding will be another man‟s confusion. Based on the perception each person will have individualistic interpretation of the message. Moreover, the chain of responses may clash with several perceptions which may add to chaos. This at times may vary from the understanding the message intended to create thus leading to misunderstanding.

ii) Competitiveness

Confidentiality used to be the hallmark of professional life before social media raised its pretty head at work culture. Whatsapp group may have come out as the most effective tools of communication but people seldom see how it has polluted the very core of communication. Constant sharing of information, pertaining to personal lives, has given rise to some negative emotions that earlier had no place at workplace. Now people compare their economic status, number of leave and vacation, proximity to superiors, happiness index and almost everything that may be compared. Who has eaten dinner at which swanky restaurant becomes national news in seconds and those not as fortunate as that will not take that news lightly and pleasantly. The competition is now not limited to the award and appreciation at the workplace. As the healthy competition becomes negative and unnecessary feeling of inferiority and jealousy, the office ambience may not remain unpolluted and can impact communication.

iii) Judgment

People pronounce judgment on people based on their profile pictures, status updates, shared posts etc. While the shared material may reflect a person‟s personality or perception, judging them entirely on that basis may not be termed fair. This inadvertently interferes in professional relationships thereby causing

a huge barrier in normal flow of communication? A good example is a superior‟s image of a subordinate based on social media projection. The subordinate may be branded as frivolous, shallow or non serious immensely coloring his/her professional image. This may take a toll on how seriously his/her work or communication will be received at workplace.

iv) Bias

Bias and prejudices are the worst enemies of communication. In case of social media it‟s the open book that creates more biases. People‟s cultural and socio perceptions are read through their activities on social media. An inactive person may be understood as unsociable and active communicator on social media may come across as too friendly or sociable. This may not always be true as people‟s virtual presence may not match his/her real presence.

v) Anxiety

Diamond and Seth (1984) define anxiety as a function that, physiologically and psychologically, warns the self of potential danger. Competitiveness, jealousy and curiosity will be the foundation for anxiety. People are worried and anxious about their status, future prospects, recognition and acknowledgments due to the information load they receive from social media. It can deeply impact mental state of a worker causing conflicts and crisis in interpersonal communication.

vi) Intrusion into privacy

The closely guarded privacy has now become the public domain thanks to social media. People are more curious towards each other‟s private lives. People are shifting their focus from a strictly professional environment to something more. This „uncalled for‟ curiosity may disrupt the flow of communication.

vii) Crumbling hierarchy

As the working professionals become social media buddies the professional hierarchy begins to crumble. Whereas it was easier to maintain a hierarchical distance earlier, the access to private life has shrunk the boundaries. It has done the maximum damage to the semantics. Professional terminology and formal language has taken a real hit. Net friendly language now constantly makes its appearance at board meetings and formal get-togethers.

viii) Suspicion

Too much communication between peer groups can cause suspicion in people‟s mind regarding the ingenuity of a person‟s words. People read between the lines, misread statements, use jaundiced perceptions. Cross checks, questions and clarifications become the customary outcomes.

ix) Rising expectations

As we expect media behavior to match social or professional behavior the demand becomes unfair. People find it difficult to match up to their social media image in professional life and in consequence they may face social ostracization. In addition to that 24*7 accessibility for work related issues are expected and if not met with it can create misunderstanding.

x) Stereotypes

These are assumptions people make about the characteristics of members of a cultural or social group. Many stereotypes are negative or even hostile and are a serious barrier to workplace communication. A joke on a particular community, shared on social platform, can have serious repercussion in interpersonal relationship thereby causing implications on communication beyond redeemable limits.

xi) Ethnocentrism

As the world becomes flatter and communication technology becomes more widespread, the chance for interactions between people of drastically different cultures also grows (Cavanaugh 2015). Ethnocentrism can also impede communication unimaginably. It is the tendency to judge other groups or communities according to the standards and values of one's own group and community. Ethnocentric views have found a new platform in Social media. It not only acts as a communication barrier but can hinder employee morale and productivity. If your culture opines that making small talk prior to conducting business is important, you may consider someone who gets right to the point to be rude. However, from another cultural perspective, someone getting down right to the business may come across as rude to you. A check on this barrier would be a difficult task during social media communication. The way people use the Internet varies worldwide. This applies to usage frequency, number and type of contacts, interactivity, and content. For example, the topics dominant in blogs or social media in Asia are different from those in the West. (Kendall and Mooji 2014). Social media with its cultural mix can be a cause for greater misunderstanding.

TECHNICAL BARRIERS

Devices are electronic systems and they keep facing errors every now and then, causing unpredictable communication errors in terms of its delivery to the desired end. Sometimes even the accuracy of these gadgets is questioned. The more we depend on these technological tools, the higher the chances are of getting error harms involved in the process (Shrivastava 2012). Delay in download, data loss, network failures, are some of the types of error that can have devastating effects in ongoing communication. The stress of inability to communicate, due to network error can stall normal life. (Brooks 2015) in his study examines the effect of personal social media usage on technology and happiness. He indicated that

higher amount of social media usage led to lower performance on task and higher levels of techno-stress, thereby resulting in lower happiness levels.

SEMANTIC BARRIER

Semantic and language barrier has become more complex with the new terminology cropping everyday on internet. The terminology is not only new but it also comes with different connotations for different situations. To communicate effectively, both parties need to speak the same language and use words that clearly say what is meant. (Conrad 2014). For a novice of social media keeping tab on the ever changing terminology may become a task. Also, ignorance of net specific language can give rise to miscommunications and misunderstanding. (McKenzie and Qazi 1983) brought out the communication barriers between native English speakers and non-native speakers. With the intrusion of social media the barrier are expected to increase.

TO CONCLUDE

There are, as with most things in life, risks and rewards in the use of social media in the workplace but, one thing is clear, it is not going away and employers have little alternative but to address it. Many organizations are putting a blanket ban on social media tools in the office which may or may not be a great idea depending upon how each individual reacts to it. There will be a time when employees and employers both will be able to use social media more responsibly. Whatever may be the case, it becomes imperative for the workplaces to have policies for a controlled use of social media. The present paper brings out the above mentioned points very succinctly and elucidates about the fact that social media intrusion affects this work place communication. More work in this regard is being done by the present authors and will be communicated in later empirical studies.

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Alternating Direction Method-Analysis based Approach for Image in Painting

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ABSTRACT

Image in painting is the process of filling-in missing or damaged information in visually plausible way. This is the process of "Image Interpolation." In painting can be used easily to remove scratches from photographs which often get damage with age as well as for film- restoration. Care should be taken while doing such restoration manually because any sign of scratch should not remain behind. So this manual process is time consuming and prone to errors as human operators have some limits while selecting best suitable patch from surrounding region of damaged area. The patch should be selected correctly so that the restoration of image will give better result. So to overcome this problem a novel method of in painting is proposed. In this paper an approach for automatic image in painting system is given using Alternating Direction Method (ADM). Analysis based approach (ADM-A) is presented which handles the inverse problem efficiently. Experimental result shows that ADM-A is efficient for object removal and for restoration of images.

Keywords— In painting, Restoration, ADM-A, Region of interest.

I. INTRODUCTION

In computer vision and graphics application image restoration is a crucial issue. Image with a missing regions or a large number of missing pixels, filling of missing elements and restoration of image should be done in visually plausible way. The core problem is how to decide which are the best suitable pixels to fill the damage region or missing region. Traditionally selection of patch is done by manually so it prone to errors and time consuming. Also selection of patch matters a lot for restoration of image. If best matching patch is not selected for filling region then visually we can see the blurring effect at restoration of image. This will lead to failure of restoration algorithm. In this paper, a novel approach is presented for object removal and restoration of image using Alternating Direction Method. Here analysis based approach is presented. Algorithm works well with real photographs taken from camera and also for images database downloaded from internet. An example is shown in fig.1. for applying ADM-A to photograph. Overall our main contributions are :1)a novel image restoration method is proposed which is very efficient and quite easy to implement using Matlab.2) The algorithm can be use to solve many problems :such as removing unwanted object from images, removing text printed on images, removing scratches on photographs which are due to ageing and for resolving the problem of image deblurring.

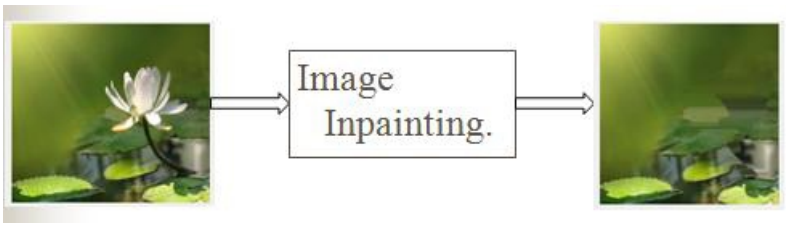

Fig.1.Process of Image Inpainting using ADM-A

II. RELATED WORK

The Alternating direction method was originally proposed in 1970s [1]. The algorithm was studied throughout the 1980s and by the mid-1990s; its convergence was established by Eckstein and Bertsekas [2]. ADMM closely related to or equivalent to many other algorithms such as Douglas-Rachford splitting method [3], proximal methods [4], the splitting Bregman iterative algorithms [5]. ADMM is a simple and powerful algorithm which is well suited to large-scale convex optimization and in particular to problems arising in signal and image processing. The fact ADMM has been re-invented in these research fields over the decade is credited to its simple form and intuitive appeal and effectiveness. In this paper a new idea is presented to use ADM for Image mapping and Object removal .This is totally new approach as in literature we cannot find use for ADM for restoration of large objects. Research is carried out on trail and error basis but experimental results shows effectiveness of this Analysis based approach. Gives better result in terms of PSNR and CPU time and MSE.

III. METHODOLOGY

Image Restoration continues to attracts attention of many researchers and engineers. In image restoration, the aim is to recover an unknown true image from a noisy measurement $u \in R^n$ from a noisy measurement $y \in R^m$ that is often modeled as

$$y = Bu + n \quad \text{..... (1)}$$

Where B is a convolution operator in image deconvolution or a projection in image inpainting and the identity map in image denoising, *n* is a white Gaussian noise with variance σ2. For solving this inverse problem many algorithms are known and depends on a variety of signal prior information. Among all this methods, emerging innovative and novel ADM method depends on sparse and redundant representations of signal.

A signal *u* is said to have a sparse representation over a known frame $W \in R^{n \times d}$ if there exists a sparse $x \in R^d$ vector such that $u = Wx$. In general, the frame may be redundant. In this paper, the redundant and normalized tight frame (Parseval frame) is used, $WW^T = I$, where I denotes the identity matrix. Thus, $u = W\left(W^T u\right)$ for every vector . $u \in R^n$ The components of the vector are $W^T u$ called the

canonical coefficients representing *u*. Hence the frame based image restoration can be described as: the coefficient vector *x* is estimated from the noisy image under the sparsity assumption first and then the unknown image *u* can be constructed as a linear combination of a few columns of frame *W*. Tight wavelet frame systems are redundant so the representation of *u* in the frame domain is not unique .i.e. the mapping from the image *u* to its coefficients is not one-to-one. Three formulations utilizing sparseness of the frame coefficients are formed namely analysis-based approach, synthesis based approach and balanced regularization approach. Here we are using analysis based approach which is formulated from balanced regularization approach as follows, equation (2) shows balanced regularization approach

$$\min_x \frac{1}{2}\|BW_x - y\|_2^2 + \frac{\gamma}{2}\|(I - W^T W)_x\|_2^2 + \lambda^T |x|_1 \quad (2)$$

where γ 0 and λ are given nonnegative weight vectors $\|\cdot\|_2$, denotes the *l*2-norm. The first term denotes penalty on the data fidelity, the last term penalizes the sparsity of coefficient vector, the second term penalizes the distance between the frame coefficients *x* and the range of W^T, i.e., the distance to the canonical frame coefficients of *u*. The larger γ makes the frame coefficients *x* closer to the range of W^T, that is to say, the frame coefficients *x* is closer to the CANONICAL frame coefficients of *u* for the larger γ [6].

On the other hand, when $\gamma = \infty$, if the problem (2) has a finite solution then the term $\|(I - W^T W)_x\|_2^2$ must be 0.This implies that *x* is in the range of W^T, i.e., $x = W^T u$ for some $u \in R^n$ [6].

Then the problem (2) can be written as

$$\min_{u \in R^n} \frac{1}{2}\|Bu - y\|_2^2 + \lambda^T |W^T u|_1 \quad \text{.....(3)}$$

Here the coefficient is in the range of the analysis operator W^T so This is called analysis-based approach. It is noted that here only the sparsity of the canonical frame coefficients is penalized, which leads to the smoothness of the underlying image.

IV. IMPLIMENTATION

We have implemented this system with Matlab 2012.Database images are collected from photographs taken with a camera. System gives better results for this photographs reconstruction after object removal from them. firstly the resizing of photograph is done with size 256 x 256 and then RGB image is converted into gray for further processing then the edge detection of the image is done by edge detection algorithm like Sobel, Prewitt or by Robert edge detector. But among all sobel edge detector gives better result so it is preferred for this experiment. Edge detection will give idea about from where we should select the object for segmentation. From this the region of interest is calculated with

interested object to be removed. For calculating the region of interest the gray image processing of photograph is done and it is converted into binary with interested object in white and background in black. Then ADM-A algorithm is applied for in painting of region of interest.

V. RESULTS

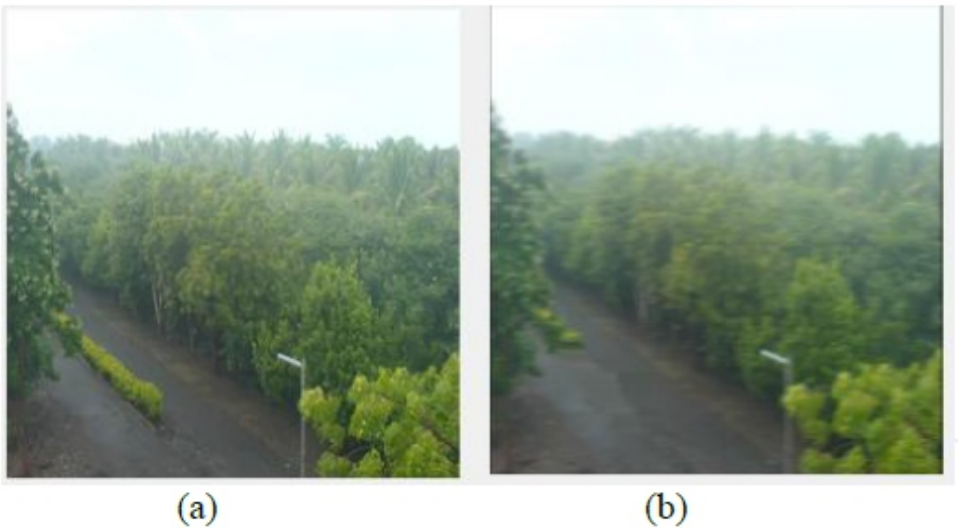

Fig.2.Image inpainting using ADM-A. (a) original image. (b) image with removal of object.

Algorithm is applied on images and result is tested for CPU time, PSNR and MSE. Results shows that ADM-A algorithm for the analysis based approach can effectively suppress the noises but it produced over-smoothed results and eliminated much image details. For the 3 images (a)(c)(d)the following table shows comparison of CPU time, PSNR and MSE.

Algorithm gives better result for text removal also, example is shown in fig(4).and from table we came to know that it will take very less amount of time for restoration of images.

Table.1.Comparison of In painted images

Image	PSNR(dB)	MSE	CPU time (sec)
(a)	28.6789	88.1443	0.56263
(c)	20.484	581.6774	0.37859
(e)	21.3417	477.4324	0.42505

© (d)

Fig.3.Image inpainting using ADM-A.(c)original image.(d)image with removal of object.

(e) (f)

Fig.4.Image inpainting using ADM-A.(e)original image. (f)image with removal of object.

VI. CONCLUSION

A result shows that ADM-A algorithm for the analysis based approach can effectively useful for reconstruction of images. Gives better result for uniform background. It suppress the noises but it produced over-smoothed results and eliminated much image details.

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The instructions to authors about the article preparation for publication in the Manuscripts are submitted online, through the e-Ur (Electronic editing) system, developed by **Enriched Publications Pvt. Ltd**. The article should contain the abstract with keywords, introduction, body, conclusion, references and the summary in English language (without heading and subheading enumeration). The article length should not exceed 16 pages of A4 paper format.

Title

The title should be informative. It is in both Journal's and author's best interest to use terms suitable. For indexing and word search. If there are no such terms in the title, the author is strongly advised to add a subtitle. The title should be given in English as well. The titles precede the abstract and the summary in an appropriate language.

Letterhead Title

The letterhead title is given at a top of each page for easier identification of article copies in an Electronic form in particular. It contains the author's surname and first name initial .article title, journal title and collation (year, volume, and issue, first and last page). The journal and article titles can be given in a shortened form.

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Full name(s) of author(s) should be used. It is advisable to give the middle initial. Names are given in their original form.

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The postal address or the e-mail address of the author (usually of the first one if there are more Authors) is given in the footnote at the bottom of the first page.

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1. Original scientific paper (giving the previously unpublished results of the author's own research based on management methods).

2. Survey paper (giving an original, detailed and critical view of a research problem or an area to which the author has made a contribution visible through his self-citation);

3. Short or preliminary communication (original management paper of full format but of a smaller extent or of a preliminary character);

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1. Professional paper (contribution offering experience useful for improvement of professional practice but not necessarily based on scientific methods);
2. Informative contribution (editorial, commentary, etc.);
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Language

The article should be in English. The grammar and style of the article should be of good quality. The systematized text should be without abbreviations (except standard ones). All measurements must be in SI units. The sequence of formulae is denoted in Arabic numerals in parentheses on the right-hand side.

Abstract and Summary

An abstract is a concise informative presentation of the article content for fast and accurate Evaluation of its relevance. It is both in the Editorial Office's and the author's best interest for an abstract to contain terms often used for indexing and article search. The abstract describes the purpose of the study and the methods, outlines the findings and state the conclusions. A 100- to 250-Word abstract should be placed between the title and the keywords with the body text to follow. Besides an abstract are advised to have a summary in English, at the end of the article, after the Reference list. The summary should be structured and long up to 1/10 of the article length (it is more extensive than the abstract).

Keywords

Keywords are terms or phrases showing adequately the article content for indexing and search purposes. They should be allocated heaving in mind widely accepted international sources (index, dictionary or thesaurus), such as the Web of Science keyword list for science in general. The higher their usage frequency is the better. Up to 10 keywords immediately follow the abstract and the summary, in respective languages.

Acknowledgements

The name and the number of the project or programmed within which the article was realized is given in a separate note at the bottom of the first page together with the name of the institution which financially supported the project or programmed.

Tables and Illustrations

All the captions should be in the original language as well as in English, together with the texts in illustrations if possible. Tables are typed in the same style as the text and are denoted by numerals at the top. Photographs and drawings, placed appropriately in the text, should be clear, precise and suitable for reproduction. Drawings should be created in Word or Corel.

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Citation in the text must be uniform. When citing references in the text, use the reference number set in square brackets from the Reference list at the end of the article.

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Footnotes are given at the bottom of the page with the text they refer to. They can contain less relevant details, additional explanations or used sources (e.g. scientific material, manuals). They cannot replace the cited literature.
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